Notice of Allowability	Application No.	Applicant(s)	
	10/055,468	THOMAS, HOWARD	
	Examiner	Art Unit	
	Ms. Arti Singh	1771	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *amendment*.
2. ☒ The allowed claim(s) is/are *1-10,12-26, 28-41 and 43-52 are allowed and renumbered as 1-49*.
3. ☒ The drawings filed on *01/23/2002* are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☐ All b) ☐ Some* c) ☐ None of the:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.
5. ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
   (a) ☐ The translation of the foreign language provisional application has been received.
6. ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application. **THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

7. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
8. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No. ____.
   (b) ☐ including changes required by the proposed drawing correction filed _____, which has been approved by the Examiner.
   (c) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No. _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the margin according to 37 CFR 1.121(d).

9. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1☐ Notice of References Cited (PTO-892)
2☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No. _____
4☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5☐ Notice of Informal Patent Application (PTO-152)
6☒ Interview Summary (PTO-413), Paper No. herein
7☐ Examiner's Amendment/Comment
8☐ Examiner's Statement of Reasons for Allowance
9☐ Other

Ms. Arti Singh
Primary Examiner
Art Unit: 1771

IN THE CLAIMS

Please amend the claims (~~strikethrough~~ indicating deletion and underline indicating insertion) as follows:

1. (currently amended) (~~presently~~ amended) An impact resistant material comprising:

a plurality of in-plane fibers defining a fabric plane; and

a plurality of upright fibers, wherein at least a portion of each upright fiber is oriented generally perpendicular to the fabric plane, said upright fibers comprising a ballistic fiber material, wherein said upright fibers comprise at least about 25% of said material.

2. (original) The impact resistant material of Claim 1, comprising a non-woven, needle-punched material.

3. (original) The impact resistant material of Claim 2, comprising a needlepunch density of at least 300 punches per square inch.

4. (original) The impact resistant material of Claim 2, comprising a needlepunch density of about 400 to 550 punches per sq. inch.

5. (original) The impact resistant material of Claim 1, wherein the ballistic fiber material is an aramid, a high performance polyethylene, a PBO fiber, a carbon fiber, a ballistic glass fiber or a ballistic nylon fiber.

6. (original) The impact resistant material of Claim 5, wherein the ballistic fiber material has a fiber strength of at least about 3 grams/denier.

7. (original) The impact resistant material of Claim 5, wherein the ballistic fiber material has a fiber stiffness of at least about 80 grams/denier.

8. (original) The impact resistant material of Claim 5, wherein the ballistic fiber material has a fiber length of less than about 4 ½ inches.

9. (original) The impact resistant material of Claim 5, wherein the ballistic fiber material has a fiber length of less than about 2 inches.

10. (original) The impact resistant material of Claim 5, wherein the ballistic fiber material has a fiber fineness of no more than about 10.0 denier.

11. (cancelled).

12. (original) The impact resistant material of Claim 1, wherein said upright fibers comprise at least about 50% of said material.

13. (original) The impact resistant material of Claim 1, having a weight of between about 2 ounces per square yard to about 4 ounces per square yard.

14. (original) The impact resistant material of Claim 1, having an air permeability of at least about 4.1 CFM.

15. (original) A ballistic resistant vest comprising the material of Claim 1, layered with a ballistic penetration resistant material.

16. currently amended (~~presently amended~~) A ballistic resistant vest comprising:

at least one layer of ballistic penetration resistant material; and

at least one impact resistant layer comprising a plurality of in-plane fibers defining a fabric plane, and a plurality of upright fibers, wherein at least a portion of each upright fiber is oriented generally perpendicular to the fabric plane, said upright fibers comprising a ballistic fiber material, wherein said upright fibers comprise at least about 25% of said at least one impact resistant layer.

17. (original) The ballistic resistant vest of Claim 16, further comprising at least one layer of ballistic resistant felt, said at least one impact resistant layer being sandwiched between said at least one layer of ballistic resistant felt and said at least one layer of ballistic penetration resistant material.

18. (original) The ballistic resistant vest of Claim 16, comprising a non-woven, needle-punched material.

19. (original) The ballistic resistant vest of Claim 18, comprising a needlepunch density of at least 300 punches per square inch.

20. (original) The ballistic resistant vest of Claim 18, comprising a needlepunch density of about 400 to 550 punches per sq. inch.

21. (original) The ballistic resistant vest of Claim 16, wherein the ballistic fiber material is an aramid, a high performance polyethylene, a PBO fiber, a carbon fiber, a ballistic glass fiber or a ballistic nylon fiber.

22. (original) The ballistic resistant vest of Claim 21, wherein the ballistic fiber material has a fiber strength of at least about 3 grams/denier.

23. (original) The ballistic resistant vest of Claim 21, wherein the ballistic fiber material has a fiber stiffness of at least about 80 grams/denier.

24. (original) The ballistic resistant vest of Claim 21, wherein the ballistic fiber material has a fiber length of less than about 4 ½ inches.

25. (original) The ballistic resistant vest of Claim 21, wherein the ballistic fiber material has a fiber length of less than about 2 inches.

26. (original) The ballistic resistant vest of Claim 21, wherein the ballistic fiber material has a fiber fineness of no more than about 10.0 denier.

27. (cancelled).

28. (original) The ballistic resistant vest of Claim 16, wherein said upright fibers comprise at least about 50% of said material.

29. (original) The ballistic resistant vest of Claim 16, having a weight of between about 2 ounces per square yard to about 4 ounces per square yard.

30. (original) The ballistic resistant vest of Claim 16, having an air permeability of at least about 4.1 CFM.

31. (~~presently amended~~ currently amended) A liner for a ballistic resistant vest comprising at least one impact resistant layer, each said at least one impact resistant layer comprising:

a plurality of in-plane fibers defining a fabric plane; and

a plurality of upright fibers, wherein at least a portion of each upright fiber is oriented generally perpendicular to the fabric plane, said upright fibers comprising a ballistic fiber material, wherein said upright fibers comprise at least about 25% of said at least one impact resistant layer.

32. (original) The liner of Claim 31, further comprising at least one layer of ballistic resistant felt, said at least one impact resistant layer being sandwiched between said at least one layer of ballistic resistant felt and said at least one layer of ballistic penetration resistant material.

33. (original) The liner of Claim 31, comprising a non-woven, needle-punched material.

34. (original) The liner of Claim 33, comprising a needlepunch density of at least 300 punches per square inch.

35. (original) The liner of Claim 33, comprising a needlepunch density of about 400 to 550 punches per sq. inch.

36. (original) The liner of Claim 31, wherein the ballistic fiber material is an aramid, a high performance polyethylene, a PBO fiber, a carbon fiber, a ballistic glass fiber or a ballistic nylon fiber.

37. (original) The liner of Claim 36, wherein the ballistic fiber material has a fiber strength of at least about 3 grams/denier.

38. (original) The liner of Claim 36, wherein the ballistic fiber material has a fiber stiffness of at least about 80 grams/denier.

39. (original) The liner of Claim 36, wherein the ballistic fiber material has a fiber length of less than about 4 ½ inches.

40. (original) The liner of Claim 36, wherein the ballistic fiber material has a fiber length of less than about 2 inches.

41. (original) The liner of Claim 36, wherein the ballistic fiber material has a fiber fineness of no more than about 10.0 denier.

42. (cancelled).

43. (original) The liner of Claim 31, wherein said upright fibers comprise at least about 50% of said material.

44. (original) The liner of Claim 31, having a weight of between about 2 ounces per square yard to about 4 ounces per square yard.

45. (original) The liner of Claim 31, having an air permeability of at least about 4.1 CFM.

46. (original) An impact resistant material comprising a plurality of fibers, at least a portion of said plurality of fibers comprising in-plane fibers defining a fabric plane, and at least 25% of said plurality of fibers comprising upright fibers having at least a portion of their length oriented generally perpendicular to the fabric plane.

47. (original) The impact resistant material of Claim 46, wherein at least 50% of said plurality of fibers comprise upright fibers having at least a portion of their length oriented generally perpendicular to the fabric plane.

48. (currently amended) ~~(presently amended)~~ A method of fabricating an impact-resistant material, said method comprising:

forming a fiber mat comprising at least one layer of fibers, said fiber mat defining a mat thickness; and

needlepunching said fiber mat to a depth of no more than about 1/3 the mat thickness to an extent wherein at least about 25% of said fiber mat comprises upright fibers oriented generally perpendicular to a plane defined by said fiber mat.

49. (original) The method of Claim 48, wherein said needlepunching step comprises needlepunching the mat at a density of at least 300 punches per square inch.

50. (original) The method of Claim 48, wherein said needlepunching step comprises needlepunching the mat at a density of about 400 to 550 punches per sq. inch.

51. (original) The method of Claim 48, wherein the step of forming a fiber mat comprises forming at least one layer of a mixture of aramid fibers and high-modulus polyethylene fibers.

52. (original) The method of Claim 49, wherein the mixture fibers further comprises PBO fibers.